

**DEPARTMENT OF THE ARMY  
HEADQUARTERS UNITED STATES ARMY INFANTRY CENTER  
FORT BENNING, GEORGIA 31905-5000**

**USAIC Regulation  
No. 40-14**

**2 May 2006**

**Medical Services  
PREVENTION OF HEAT INJURY**

**History.** This is a revision of the publication. The portions affected by this revision are listed in the summary of change.

**Summary.** This regulation revision includes clarification on the post heat category and heat alert warning system, links for resources on the world wide web, HEAT acronym definitions, guidance on blood donations, recommendations for adjustments to training, guidance on how to use the WBGT to control physical activity, recommended clothing adjustments during periods of heat stress, treatment methods for heat stroke victims, WBGT replacement parts, a heat risk management guide, a temperature/humidity to heat category conversion chart, and information on the use of nutritional supplements.

**Applicability.** This regulation applies to all elements of this command, including tenants and satellite units and activities.

**Supplementation.** Supplementation of this regulation is prohibited without prior approval from Commander, United States Army Infantry Center, ATTN: ATZB-HS, Fort Benning, Georgia.

**Suggested improvements.** The proponent of this regulation is the Director of Health Services (ATZB-HS). Send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) through channels to the Directorate of Health Services, Preventive Medicine, ATTN: MCXB-PM, Fort Benning, GA 31905.

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**Chapter 1  
Introduction**

**1-1. Purpose.**

To prescribe policies, procedures and responsibilities for the prevention of heat injuries to members of this command, Fort Benning, Georgia.

**1-2. References.**

Required and related publications and prescribed and referenced forms are explained in appendix A.

**1-3. Explanation of Abbreviations and Terms.**

Abbreviations and special terms used in this regulation are explained in the glossary.

**1-4. General.**

This regulation provides information on the causes, types and first aid measures for heat injuries. It provides guidance to commanders on preventive measures to be followed and means of recognition of heat injuries.

**Chapter 2  
Responsibilities**

**2-1. Commanders at All Levels.**

Commanders will:

- a. Understand that the general post heat category is not a substitute for on-site measurement of the Wet Bulb Globe Temperature (WBGT) index and that such measurements are required on an hourly basis when the ambient air temperature is above 75° F.
- b. Be familiar with this regulation and TB MED 507, Heat Stress Control and Heat Casualty Management; and ensure that every precautionary action to prevent heat injury is fully and completely implemented.
- c. Provide a 14-day acclimatization program, when feasible, for Soldiers not accustomed to the heat.
- d. Ensure those who schedule training are made aware of the necessity of planned acclimatization programs and know of the hazards for unseasoned personnel.
- e. Ensure that all assigned personnel know, to an extent commensurate with their ability and responsibility, the hazards of heat injury, the proper means of heat injury prevention, the recognizable early signs of heat injuries and the steps to take if heat injury occurs.

f. Ensure that incoming soldiers are briefed on heat injury risk, individual precautions, and use of the buddy system to recognize the symptoms of heat injury in fellow Soldiers.

## 2-2. Medical Department Activity.

The Commander will:

- a. Ensure that information is made available to advise all personnel of heat injury hazards.
- b. Maintain a phone line and a webpage that provide general post heat category information from 1 May through 30 September.
- c. Provide assistance and guidance to commanders concerning development of appropriate procedures and plans.
- d. Review written procedures and plans submitted by major unit commanders and provide comments on appropriateness of these procedures and plans.
- e. Conduct training for cadre and leaders upon request on heat injury prevention and treatment.
- f. Track heat related illnesses.
- g. Ensure that all medications that increase heat injury risk are clearly marked.

## 2-3. Director of Operations and Training.

The Director of Operations and Training will disseminate the general post heat category information according to the Two Star Pager System during normal duty hours.

## 2-4. Major Subordinate Commanders.

Major Subordinate Commanders will:

- a. Establish written procedures for the prevention of heat injury by their cadre personnel, based on the particular type of training in which they are engaged (such as, Initial Entry Training, Airborne and Ranger Training, extended field exercises, etc.).
- b. Ensure all Soldiers receive training in the causes, preventive measures, symptoms and emergency treatment of heat injuries beginning in March and no later than 1 May of each year using installation-approved slides. Annually, initial train-the-trainer briefings should be conducted by Preventive Medicine or organic medical provider. Ensure that cadre personnel arriving within their commands during the March to November time period receive such training as soon as possible after their arrival (may be conducted by unit members). Ensure all cadre personnel training is documented.
- c. Ensure that adequate acclimatization (2 weeks, when feasible) is included in training schedules for newly arrived personnel. All commands will place the "Heat Acclimation Guide" on web sites. Refer to the elite acclimation guide located at: <http://chppm-www.apgea.army.mil/heat/HeatAcclGuidelinks.pdf>
- d. Require units engaged in training during heat hazard periods to follow established evacuation policies.
- e. Ensure each subordinate company-sized unit has a WBGT Kit, or similar device (i.e., Kestrel monitor), to perform local on-site heat category level monitoring when conducting training and the ambient air temperature is above 75° F.
- f. Review all training and operations to make sure adequate planning is made for emergency medical support and heat injury assessment and management where tactically feasible.
- g. Document Heat Prevention Training for all unit personnel.

## 2-5. Unit Commanders.

Unit Commanders will:

- a. Assess training/mission hazards for heat stress and develop and implement controls for heat stress exposure (appendix C).
- b. Ensure that all personnel have ample quantities of drinking water available during hot weather. Require all personnel to drink water during each rest period in accordance with figure 3-2. The water should be potable and cool (**NOT COLD**).
- c. Ensure that each Soldier carries at least one canteen which is to be refilled at the beginning of every work period and during each rest period.
- d. Ensure that rest periods are scheduled and adhered to in accordance with figures 3-1 and 3-2.
- e. Utilize the unit's WBGT Kit when ambient air temperature is above 75° F. Record the WBGT index hourly in a log and keep the log on file for three years.

f. Ensure all supervisors have in their possession FB Form 7 (Heat Injury Prevention) or the Heat Injury Prevention (HIP) Pocket Guide. Units may obtain FB Form 7 from Post Publications, (Bldg 110) or the HIP pocket guide from Preventive Medicine (545-1144) or <http://chppm-www.apgea.army.mil/heat/>.

g. Document Heat Prevention Training for all unit personnel.

h. Ensure that personnel who are at high risk for heat injury (see 3-1 a-e below) are identified with a highly visible marker that is worn on ALL uniforms, including PTU. Suggested marking methods include white tape on the upper left arm or colored wrist bands.

i. Ensure that all arriving Soldiers receive a heat injury safety briefing prior to the initiation of any program of instruction.

## Chapter 3 Heat Injury

### 3-1. High Risk Groups.

Any individual may become a heat casualty without proper preventive measures. However, some personnel are at greater risk due to various conditions or circumstances. The most common of these are given below, and will be of special concern to commanders.

#### a. Unacclimatized Individuals.

Personnel who are not used to physical activity under conditions of high temperature and humidity are particularly susceptible to heat injury and must be acclimatized to hot, humid weather. Persons reporting to Fort Benning who have come from cooler climates or regions with lower humidity are also at particular risk. As feasible, a period of two weeks with progressive degrees of heat exposure and physical exertion must be allowed regardless of the individual's physical condition (refer to paragraph 3-1(e)). To the greatest extent possible, Commanders are required to assure acclimatization programs on an on-going basis for personnel joining their commands from other areas. Figure 3-1 provides guidance for activities for unacclimatized personnel.

#### b. Poor Physical Fitness.

Military personnel who maintain a high state of physical fitness have considerable physical reserve and resiliency to meet the increased physical demands of work in hot weather. Conversely, personnel in poor physical condition have only a marginal capacity for work and are more readily exhausted by work in a hot environment.

#### c. Medical Conditions.

Conditions which are known to increase an individual's chance of suffering a heat injury include, but are not limited to: infections, obesity, reactions to immunizations, recuperation from illness or injury, fever from any cause, sunburn, severe heat rash, scarring from burns over large areas of the body, previous occurrence of heat-stroke, dehydration, use of alcohol within the past 24 hours, lack of sleep, fatigue, nicotine, vomiting and diarrhea. Likewise, medications containing atropine, medication for high blood pressure, antihistamines, cold medications, tranquilizers, and some diarrhea medications may cause adverse reactions in individuals working in a hot climate. Commanders and leaders must be aware of the individual Soldier's profile limitations. Caffeine, though not commonly regarded as a medication, is frequently ingested in the form of coffee or carbonated soft drinks, acts as a diuretic and will interfere in maintaining adequate body fluid levels. Avoid Caffeine.

#### d. Initial entry trainees.

These individuals are particularly susceptible to heat injuries as they are both unacclimatized and many are not accustomed to vigorous exercise. A full 14 days of exposure to heat combined with aerobic physical exertion is needed to accomplish acclimatization. The schedule at figure 3-1 must be closely followed during the acclimatization period. IET Soldiers are most likely to experience sudden death associated with heat injury during their first month of training. All IET cadre will be trained on the location and use of Automated External Defibrillators.

#### e. Ranger, Airborne and other elite courses.

These individuals may refer to the elite acclimation guide located at: <http://chppm-www.apgea.army.mil/heat/HeatAcclGuidelinks.pdf>

First 14 Days Schedule, Heat Category III and Less			
Upon notification of category IV or V, curtail all strenuous physical training for unacclimatized personnel.			
STRENUOUS PHYSICAL OUTDOOR EXPOSURE		TRAINING/ REST CYCLES	WATER INTAKE
DAY	TIME	IN MINUTES	QTS/HR
1 <sup>st</sup>	1 Hr Max	15/10	1-1.5
2 <sup>nd</sup>	1 1/2 Hr Max	15/10	1-1.5
3 <sup>rd</sup>	2 Hr Max	30/15	1-1.5
4 <sup>th</sup>	2 1/2 Hr Max	30/15	1-1.5
5 <sup>th</sup>	3 Hr Max	30/15	1-1.5
6th - 14th	Normal duty hours	30/15	1-1.5

Figure 3-1. Acclimatization schedule for nonacclimatized personnel

Heat Category	WBGT Index, °F	EASY WORK		MODERATE WORK		HARD WORK	
		Work/ Rest	Water Intake, Quarts per hour	Work /Rest	Water Intake, Quarts per hour	Work /Rest	Water Intake, Quarts per hour
1	78-81.9	NL	½	NL	¾	40/20 min	¾
2	82-84.9	NL	½	50/10	¾	30/30 min	1
3	85-87.9	NL	¾	40/20 min	¾	30/30 min	1
4	88-89.9	NL	¾	30/30 min	¾	20/40 min	1
5	> 90	50/10	1	20/40 min	1	10/50 min	1
Fluid Replacement Guidelines* for Warm Weather Training (Average Acclimated Soldier wearing BDU, Hot Weather).							
* Volumes listed are required to support work/rest times listed for each work level. NL, no limit to work time per hour. <b>Hourly fluid intake should not exceed 1½ quarts. Daily fluid intake should not exceed 12 quarts.</b>				NOTE: MOPP gear adds 10°F to WBGT Index and Body Armor adds 5°F to WBGT Index. Rest means minimal physical activity (sitting or standing) and should be accomplished in shade if possible.			
Easy Work		Moderate Work			Hard Work		
<ul style="list-style-type: none"> <li>• Weapon Maintenance</li> <li>• Walking Hard Surface at 2.5 mph, ≤ 30 lb Load</li> <li>• Manual of Arms</li> <li>• Marksmanship Training</li> <li>• Drill and Ceremony</li> </ul>		<ul style="list-style-type: none"> <li>• Walking Loose Sand at 2.5 mph, No Load</li> <li>• Walking Hard Surface at 3.5 mph, ≤ 40 lb Load</li> <li>• Calisthenics</li> <li>• Patrolling</li> <li>• Individual Movement Tech. such as low crawl, high crawl</li> <li>• Defensive Position Construction</li> <li>• Field Assaults</li> </ul>			<ul style="list-style-type: none"> <li>• Walking Hard Surface at 3.5 mph, &gt; 40 lb Load</li> <li>• Walking Loose Sand at 2.5 mph with Load</li> </ul>		

Figure 3-2. Activity for physically conditioned, acclimatized personnel

### 3-2. Heat Injury Types, Their Treatment and Evacuation Policy.

#### a. Types of Heat Injury

Five types of heat injury are recognized: sunburn, heat edema, heat cramps, heat exhaustion, and heat stroke. The types of heat injury are described in (1) through (5) below: All soldiers in training will be familiar with the signs and symptoms of heat injury and will utilize the buddy system to monitor each other.

##### (1) Sunburn

While sunburn is generally not a condition of great military significance, severe cases requiring hospitalization occur among individuals who expose themselves to too much sun. Sunburn may also affect the body's ability to dissipate heat. The remaining four types can be of great military importance.

##### (2) Heat Edema

The mildest form of heat-related illness, it occurs when swelling develops in the hands and feet when held in a dependent position. First aid for heat edema is described in figure 3-3:

##### (3) Heat Cramps

Painful constrictions of the muscles of the arms, legs, abdomen, or back caused by large salt losses through sweating. They are commonly associated with heavy physical exhaustion. First aid for heat cramps is described in figure 3-3 below:

##### (4) Heat Exhaustion

This occurs as a result of excessive loss of water from the body. The Soldier may develop heavy labored breathing, profuse sweating, headache, weakness, unsteady balance and nausea. Heat cramps may also be present. The victim's skin will usually feel cool and moist; the victim will be sweating profusely and will have a rapid, feeble pulse. First aid for heat exhaustion is described in figure 3-4 below:

##### (5) Heat Stroke

This represents a TRUE MEDICAL EMERGENCY. Results from a breakdown in body temperature control by an excessively high internal body temperature, which may be up to 106-108 degrees Fahrenheit.

heit. Even at lower body temperatures (101-105 degrees Fahrenheit), heat stroke must be considered as a possibility if mental function is impaired, as evidenced by confusion or unconsciousness. Any Soldier who develops abnormal mental status or unconsciousness during training should be treated as a heat stroke until proven otherwise. Persistently high body temperature caused by internal (vigorous exercise) and external (environmental) factors combine to cause this frequently fatal condition. When heat stroke is suspected or recognized, immediate cooling in conjunction with evacuation to the nearest hospital emergency room by calling 911 for ambulance transport. Although it may be accompanied by a severe headache, upset stomach and weakness, its onset is frequently sudden with loss of consciousness, convulsions, or delirium. The single most important objective of treatment is lowering the victim's high body temperature as rapidly as possible. First aid for heat stroke is described in figure 3-5:

**b. Measuring body temperature.**

(1) Persons should be evaluated on the basis of symptoms of heat injury. All supervisors must recognize that heat injury may occur at minimally elevated body temperatures.

(2) The most accurate, practical assessment of body temperature is rectally. However, if units do not possess appropriate equipment and there is a question of whether a person may possibly have a heat injury, Thermoscans may be utilized. Thermoscans, however, may misrepresent temperature by as much as 10 degrees Fahrenheit.

(3) If utilized, Thermoscan will be measured three times, alternating ears. The three measures are then averaged.

**c. Evacuation of Heat Casualties**

Transport heat casualties to the closest hospital emergency room (not a TMC) via emergency medical services (Call 911) if any of the following factors exists:

(1) Change of mental status (such as, unconsciousness, confusion, disorientation, combative behavior).

(2) Concerning symptoms and a Thermoscan average temperature 101 degrees or higher.

(3) The Soldier shows no response to treatment within 30 minutes of cooling and hydration (could indicate a different diagnosis or more serious heat illness).

(4) The Soldier is improving but has not returned to baseline after 1 hour of hydration at a rate of 1 quart of cool water every 30 minutes and cooling in the field.

(5) A combat life saver or Medic administers an IV. An IV is an evacuation pre-management procedure. Any Soldier receiving an IV outside of a medical treatment facility must be appropriately screened and evaluated by a medical officer. If a Soldier receives an IV and is not evaluated by a unit medical officer, then the Soldier must be evacuated to the hospital.

(6) The Soldier vomits more than once.

**(7) WHEN IN DOUBT, EVACUATE THE SOLDIER TO THE CLOSEST HOSPITAL EMERGENCY ROOM.**

**d. Ice Sheets**

(1) Ice sheets are a field-expedient means of rapidly cooling a heat injury victim. To prepare, fill a cooler containing clean, flat bed sheets with water and ice. The cooler should be immediately available at all risk events.

(2) To apply:

(a) Remove victim's BDU/ACU jacket, loosen belt, and remove boots and socks.

(b) Wad up 3 ice sheets and place 1 under each armpit and in the groin region.

(c) Carefully log-roll victim onto their side; place one sheet under the person and lay them onto it. Wrap the body with the sheet.

(d) Place 1 sheet under the head and neck, and gently place sheet over neck and chest. Be certain the victim's face is not covered. Continuously monitor the victim's breathing and heart rate.

(e) Replace sheets as they warm. Warm sheets should be returned to the cooler for reuse.

(3) Company-sized elements should carry at least 15-20 sheets. This will require at least 2 coolers.

**3-3. Preventive Measures.**

**a. Heat Injuries are Preventable**

Leaders prevent heat injuries. Leaders must identify hazards and conduct risk assessments to mitigate the risk of heat injury (Appendix C). Heat injuries can occur during any time of year. At Fort Benning, March and November are hazardous months since personnel do not expect heat casualties during these "cool" months. Education of all personnel, especially supervisors, on the causes of heat related injuries and preventive measures are vital to prevent heat casualties. All personnel must know symptoms and emergency treatment procedures. All Soldiers must receive training on the prevention of heat injuries beginning in March and no later than 1 April of each year. Cadre personnel arriving at Fort Benning during the March through November period must receive training and be certified as soon as possible after arrival. Training must cover causes, preventive measures, symptoms, and emergency treatment procedures. Unit commanders document completion of this training.

**b. Heat Injury Risk is Cumulative**

Four factors contribute to this effect:

(1) High heat category – especially when there are several sequential days of high temperatures. Utilizing opportunities to release heat is important; examples include allowing Soldiers time for showers after PT, an additional cool/cold naked shower in the evening, exposure to air conditioned environments and swimming.

(2) Exertion level – when intense physical activity occurs several days in a row.

(3) Acclimation – the prior exposure of Soldiers to physical exertion in a warm environment during the weeks prior to this training.

(4) Temperature at night / rest overnight – leaders must ensure that Soldier sleep areas are adequately cooled and that Soldiers are allowed at least 4 hours of sleep per 24 hours when training during warm weather.

**c. Blood Donation**

Do not allow blood donation among IET, Ranger, Airborne and other elite course students where high levels of physical exertion are expected. Blood donations may be authorized during recovery period prior to graduation.

**d. Command Information and Education**

Commanders at all levels will become familiar with the provisions of this regulation to ensure that assigned missions are accomplished with proper regard to heat injury hazards. The instructions contained in this regulation will be used by commanders in preparing lectures on the prevention and first aid treatment of heat injuries. Each year, prior to the onset of hot weather, each organization will devote one "Officer's Call" and "NCODP" and one troop information CTT instruction period to this subject. Incoming supervisors, such as assigned cadre, squad leaders and section sergeants, will be oriented to their responsibilities in the prevention, recognition, and emergency management of heat injuries prior to their assumption of those duties in the hot weather season (March through November).

**e. Acclimatization**

Commanders and leaders will assist all assigned personnel to acclimatize to their work in high temperature and humidity by ensuring that work or training requirements are gradually and progressively more strenuous over a two week period. Identify and pay particular attention to Soldiers reporting to Fort Benning who come from cooler climates or regions with lower humidity. Acclimatization of personnel should commence in March and continue through September for newly assigned personnel. See figure 3-1 for acclimatization schedule.

**f. Water**

Adequate water intake is an important factor in preventing heat injury. Water loss replacement is best done by periodically drinking small amounts throughout the work period. "Water Loading," the adequate intake of water prior to physical exertion, should start well ahead of the work or exercise that is scheduled. Each initial entry trainee should consume 10-12 quarts of water per 24-hour period. Supervisors must enforce this water doctrine since the thirst mechanism is an inadequate stimulus to replace the water loss of the body. It is also important that fluid consumption not exceed these guidelines. Excessive fluid intake can lead to water toxicity or hyponatremia. These conditions can be fatal. As noted in figure 3-2, hourly fluid intake should not exceed 1 ½ quarts and daily fluid intake should not exceed 12 quarts. Soldiers will frequently become dehydrated by one or two quarts of water before the thirst mechanism warns them to drink. Cooling the water makes it more palatable. If possible, water

should be furnished between 50 and 60 degrees Fahrenheit and flavored lightly with citrus fruit flavors. Without replacement of water, work and perspiration in a hot environment will inevitably lead to heat exhaustion and heat stroke. Acclimatization allows body hormones to reduce losses of body salts through sweating, but the loss of water (the means of cooling the body by perspiration) continues unchanged by acclimatization.

#### g. Food and Salts

A regular diet will supply more than enough salt to replace body salts lost through perspiration. Commanders will ensure that assigned personnel, particularly initial entry training Soldiers, are provided all prescribed meals and sufficient time to eat. Encourage Soldiers to salt their food. Units should monitor meal consumption to ensure that Soldiers are eating adequately. Each initial entry training Soldier will be required to eat three meals each day. Reduction of body weight by severe dieting is not permitted during initial entry training, airborne training, and ranger training. The day's heavy meal should be served in the evening. Supplemental salt in the form of salt tablets can be hazardous. Supplemental electrolyte drinks such as Gatorade® are encouraged in IET, IMT, Ranger, and Airborne training.

#### h. Nutritional Supplements

(1) Commanders will ensure all Soldiers are briefed on the dangers associated with taking nutritional supplements containing ephedrine alkaloids. Nutritional supplements containing ephedrine alkaloids are prohibited. Nutritional supplements that contain other stimulants such as guarana may also increase heat injury risk. Discourage Soldiers from taking supplements.

(2) Examples of supplements containing stimulants include: Ripped Fuel, Ma Huang, Chinese ephedra, diet pills, and epitonin. There are many other products that contain ephedrine. Soldiers are responsible for reading the label and ensuring the products used do not contain ephedrine.

(3) Creatine use can also be harmful. Examples of supplements that contain creatine include: ProMax bars, Pro Rx, and Ultramet Protein Mix.

#### i. Restriction of Activity According to Heat Intensity

Two factors govern the restriction of physical activity in hot, humid weather.

(1) The first and most important factor is good sense. Commanders and direct supervisors of personnel working in heat will not ignore indications that physical activity of individuals or groups of personnel should be restricted merely because notice of a change in "Post Heat Condition" has not been received. Many heat casualties have occurred before Heat Category 1 is reached. Personnel who are allowed to dress too warmly on "mild" days can overheat and become casualties. Units will have on hand a portable WBGT Kit when ambient air temperature is above 75°F. WBGT Kit, NSN: 6665-00-159-2218, are available through unit supply channels. See appendix B for further information on the WBGT kit.

(2) Physical activity in all operations and training will be modified in successive stages of "Heat Categories" according to the Wet Bulb Globe Temperature Index as determined by the unit's WBGT Kit. See figures 3-1 and 3-2.

#### j. Adjustments of Training

Certain training activities increase the risk for heat casualties. High risk physical training activities may be defined as organized vigorous physical training involving large muscle groups with duration of 15 minutes or greater without a rest cycle and frequently performed under timed conditions. Examples include: running, navigation courses, road marches, "grass drills" involving push-ups, sit-ups, running in place, and pull-ups. Devote maximum attention to the intensity and duration of scheduled training so that these activities are conducted in accordance with figures 3-1 and 3-2. The coolest part of the day at Fort Benning is early morning. WBGT indexes are often still high in the late afternoon and evening. High risk training activities, particularly running, should be performed in the early mornings. Conduct runs in formation at a double arm interval to allow air movement within the formation. Significant temperature increases are observed in the center of normal interval formations while running. Encourage cold showers after strenuous training to help cool the Soldiers. Hosing down Soldiers in uniform is discouraged.

#### k. Provisions for Adequate Rest

A proper amount of rest and avoidance of over-fatigue are important in the prevention of heat injuries. Each individual should obtain at least 4 hours of sleep per 24-hour period when training during warm weather. An air conditioned sleeping environment is beneficial if the

situation permits. Inspect all trainee barracks on a daily basis to ensure that air conditioning is functioning. If training programs are modified to schedule the more strenuous physical activities during the cooler parts of the day, these modifications will not be such as to deprive personnel of the prescribed amount of sleep. Troops should not be so fatigued that they do not awaken refreshed after a night of rest. Prolonged exposure to high temperatures at night as well as in the daytime will decrease the amount of work that personnel will be capable of performing effectively. At the discretion of the commander, it may be desirable to allow an hour of rest following the noon meal.

#### l. Use of WBGT to Control Physical Activity

(1) When the WBGT index reaches 78° F (heat cat 1), hard physical work may precipitate heat illness or injury; therefore, limit hard physical work and emphasize fluid replacement.

(2) When the WBGT index reaches 82°F (heat cat 2), limit moderate and hard physical work and emphasize fluid replacement.

(3) When the WBGT index value reaches 85°F (heat cat 3 & 4), employ increased rest periods for moderate and hard work and emphasize fluid replacement. Avoid outdoor classes in the sun.

(4) When the WBGT index value reaches 90°F (heat cat 5), limit easy, moderate, and hard work and emphasize fluid replacement. Suspend physical training and hard work for all personnel (excluding essential operational commitments not for training purposes, where the risk of heat illness/injury may be warranted).

(5) Wearing of NBC clothing (MOPP) in effect adds 10°F for easy work but 20°F for moderate and hard work. Wearing body armor adds 5°F to WBGT index in humid climates. Adjust guidance appropriately.

(6) Specific guidance for work periods, work-rest ratios and fluid replacement are provided in tables within this document.

#### m. Clothing and Equipment

Clothing and equipment should be worn so as to permit free circulation of air between the uniform and the body surface; such as, loose fitting, especially at the neck, wrists, and legs. Under heat alert conditions, commanders will direct adjustments in the uniform for personnel engaged in fatigue details, training activities, and/or parade functions. Commanders will pay particular attention to the use of individual body armor, directing Soldiers to remove body armor as often as possible to reduce heat accumulation during heat season. Recommended adjustments include: heat category 1-2: no restriction; heat category 3: unblouse trouser legs and unbuckle the web belt; heat category 4-5: unblouse trouser legs and unbuckle the web belt, remove t-shirt from under the ACU/BDU top or remove ACU/BDU top down to t-shirt, remove helmets unless there are specific safety reasons to keep them on. In the presence of full direct sunlight, removal of underlying clothing, such as the brown undershirt, is advisable; however, the body should still be fully covered by the ACU/BDU jacket in order to reduce the solar heat load. Where exposure to sunlight is not a hazard, the outer layer of clothing, such as the ACU/BDU jacket, should be removed to reduce the body temperature. It is appropriate to prescribe the undershirt as an outer garment for these activities in which the protection of the ACU/BDU jacket is not necessary. When exposure to direct and strong sunlight with the ACU/BDU jacket off is not avoidable, personnel should be allowed to rest periodically in shaded areas. When that is not possible, sunscreen should be provided and utilized. Furnish sunscreen, NSN: 6505-01-121-2335, to prevent sunburn. Shirts should not be starched after washing. Protection from the environment also includes such simple but frequently overlooked things as marching troops over grass rather than concrete and operating in as much shade as is available. Movement at a walk and generally slowed pace will also reduce individual heat stress. Consideration must be given to protection of Soldiers involved in industrial-type operations where heat is a factor. Those activities may include, as an example, laundries, dry cleaning plants, and motor maintenance facilities. The heat alert categories will apply to personnel engaged in industrial type operations. Desert operations present a different environmental challenges requiring other recommendations on the wearing of clothing and equipment (see FM 10-3).

#### n. Observation

Commanders and leaders at all levels of responsibility will constantly observe their personnel for signs and symptoms of heat injury. Although the greatest emphasis must be placed on the prevention of heat casualties, it is also important that all personnel be familiar with signs, symptoms, and first-aid treatment of heat injury as outlined in chapter 3-2.

- 
1. PLACE THE SOLDIER IN THE SHADE.
  2. LAY FLAT, ELEVATE LEGS
  3. LOOSEN CLOTHING
  4. GIVE COOL WATER TO DRINK
  5. FAN
  6. EVACUATE TO NEAREST TROOP MEDICAL CLINIC (if no improvement in 30 minutes)
- 

Figure 3-3. First aid for heat edema and heat cramps

- 
1. PLACE THE SOLDIER IN THE SHADE
  2. LAY FLAT, ELEVATE LEGS
  3. REMOVE CLOTHING (strip to underwear) AND SOAK WITH WATER
  4. FAN
  5. GIVE COOL WATER TO DRINK.
  5. EVACUATE TO NEAREST HOSPITAL EMERGENCY ROOM
- 

Figure 3-4. First aid for heat exhaustion

- 
1. **COOLING IS THE FIRST PRIORITY.**
  2. TAKE THE FOLLOWING STEPS IMMEDIATELY:
    - a. KEEP THE SOLDIER'S AIRWAY OPEN. Gurgling sounds or no air movement indicates respiratory difficulty. Lay Soldier flat, elevate legs. Extend the neck to straighten the airway and check the mouth for obstruction by the tongue or foreign object.
    - b. PLACE PATIENT IN THE SHADE.
    - c. **CALL 911** to evacuate to the closest hospital emergency room.
    - d. REMOVE CLOTHING - strip to underwear.
    - e. WRAP SOLDIER IN ICED SHEETS, to include head and body and fan.
    - f. START an IV. Give no more than one liter of normal saline.
    - g. If available, place small amounts of ice in armpits, groin, and neck areas.
    - h. RE-COOL SHEETS as they become warm every 2-3 minutes).
    - i. Continuously recheck pulse and breathing of an unconscious patient.
    - i. EVACUATE:
      - (1) All Soldiers with suspected heat stroke will be evacuated to the Martin Army Community Hospital Emergency Room. Call 911 to alert in order to alert all possible responders.
      - (2) During evacuation, continue to monitor patient and continue active cooling measures.
      - (3) Patients with suspected heat stroke should always be evacuated via ambulance. The key priorities while awaiting EMS are airway, breathing and cooling.
  3. **THE MOST IMPORTANT TREATMENT IS LOWERING THE PATIENT'S BODY TEMPERATURE. ICED SHEETS (BED SHEETS SOAKED IN ICE WATER) WILL BE UTILIZED AS THE PRIMARY METHOD TO REDUCE THE TEMPERATURE OF ANY SOLDIER WITH ABNORMAL MENTAL STATUS.** Evacuate to nearest hospital emergency room via the Emergency Medical System (EMS).  
**NOTE: Do not give unconscious patient fluid by mouth.**
- 

Figure 3-5. First aid for heat stroke

## Chapter 4

### Heat Category Surveillance

#### 4-1. Heat Alert Warning System.

a. General: This system is not a substitute for on-site monitoring of the WBGT index. The Heat Alert Warning System is a uniform system for dissemination of warnings of adverse hot weather conditions which are conducive to heat injury. It alerts commanders of the increased risk of heat related injuries. The Heat Alert Warning System is based on the table listed in appendix D and is meant to supplement on-site WBGT readings.

b. Heat Categories and WBGT Indexes are depicted in figure 4-1 below, as adapted from FM 21-10, 21 June 2000:

#### 4-2. Monitoring/Reporting Heat Categories and WBGT Readings.

a. The Directorate of Operations and Training (DOT) will monitor and report the general post heat condition by contacting the Environmental Health Section from 1 May through 30 September, or at any time during the remainder of the year that the ambient air temperature exceeds 75 degrees Fahrenheit for two or more days in succession.

b. Procedures for Distribution of the General Post Heat Condition:

(1) During normal duty hours, the Directorate of Operations and Training will obtain general post heat category information from the Environmental Health Section by calling either 545-4679 for a recorded heat category or going to the following website – <http://www.martin.amedd.army.mil/index.html> and following the link to the heat index. For heat categories of 1 and higher, personnel from DOT will then input the appropriate heat category into the Two Star Pager system which will immediately disseminate to the appropriate commands.

(2) After normal duty hours, the SDO, USAIC, will disseminate the heat category using the same procedures as DOT.

#### 4-3. Alternate Temperature/Humidity Readings.

a. Local temperature/humidity readings are available at the following web sites:

- (1) [www.weather.com](http://www.weather.com)
- (2) [www.srh.noaa.gov](http://www.srh.noaa.gov)
- (3) [www.wtvm.com](http://www.wtvm.com)

b. Continuous weather information is broadcast over the "weather radio" for the Columbus, Georgia, area on frequency 162.4MHZ.

c. Contact MEDDAC, Preventive Medicine, 545-1445/1446, during normal duty hours for WBGT information.

#### 4-4. Units and Activities Receiving Notification.

Units and activities that receive heat alert notification through the Heat Alert Warning System must ensure that this information is disseminated to the lowest level within their command and/or control, as soon as possible after receiving notification.

#### 4-5. Cancellation of Heat Alerts.

When the general post heat condition falls below 1 after an alert has been called, the notification procedures outlined above will be used to cancel the heat alert. Otherwise, alerts, once called, remain in effect until upgraded, downgraded or canceled.

#### 4-6. Actions by Subordinate Units:

Subordinate unit commanders will, upon receipt of information that a heat alert is in effect, modify such activities as marches, physical training, drill, field problems, fatigue details and outside work in which personnel are unduly exposed to direct sunlight and high relative humidity. These actions will be in accordance with the guidelines provided in figures 3-1 and 3-2. **THERE WILL BE NO TIMED RUNS, APFTs, TIMED ROAD MARCHES OR 5 MILE RUNS in HEAT CATEGORY 4 or 5.**



Heat Category	WBGT Index F
I	78.0-81.9
II	82.0-84.9
III	85.0-87.9
IV	88.0-89.9
V	90.0 & above

Figure 4-1. Heat Categories and WBGT Indexes

## Chapter 5 Reports

### 5-1. Reportable Illnesses.

When personnel are hospitalized or placed on quarters due to heat injury and miss at least one full duty day, they will be considered victims of a reportable illness. Medical staff, MACH will notify the Department of Preventive Medicine (DPM) of all suspected and confirmed cases of heat injury to include hyponatremia. DPM will complete reporting procedures.

### 5-2. Accident Reports.

Commanders will prepare an Accident Report (RCS: CSGPA-147(R4)), DA Form 285-AB-R, JUL 94, as prescribed in AR 385-40 Accident Reporting and Records and forward it within 14 working days to this Headquarters, ATTN: Safety Office (ATZB-PSS).

## Appendix A References

### Section I Required Publications

TB MED 507  
Heat Stress Control and Heat Casualty Management

AR 385-40  
Accident Reporting and Records

TRADOC Regulation 350-21  
Prevention of Heat and Cold Injuries

### Section II Related Publications

FM 21-10  
Field Hygiene and Sanitation

FM 90-3  
Desert Operations <http://chppm-www.apgea.army.mil/heat/>

### Section III Prescribed Forms

FB Form 7  
Heat Injury Prevention (prescribed in para 2-5.f.)

## Appendix B How to Use the WBGT Kit/Ordering Information

#### a. Method One

(1) The WBGT Index is calculated using three thermometer readings weighted proportionately to simulate the relative effects of ambient air temperature, humidity, and solar loading on the human body.

(2) Place the WBGT kit on a wooden stand or camera tripod about 4 feet off the ground, away from buildings or trees. Utilize the WBGT kit in the area in which training will be conducted.

(3) Open the lid of the kit. Lift the thermometer assembly up and out. Orient the kit so that the black globe thermometer is closest to the sun.

(4) Fill the wet bulb thermometer reservoir with water, preferably distilled.

(5) Wait 10 minutes for the thermometers to adjust to the climate conditions.

(6) Note readings. Then use the instructions on the slide rule on the WBGT kit to calculate the WBGT Index.

#### b. Method Two

(1) Note readings for each thermometer, wet bulb, black globe, and dry bulb.

(2) Use the following formula to calculate the WBGT index:

(a)  $WBGT\ Index = 0.7 (Wet\ Bulb) + 0.2 (Black\ Globe) + 0.1 (Dry\ Bulb).$

#### (b) Example:

Wet Bulb temp = 76 °F

Black Globe temp = 118 °F

Dry Bulb temp = 90 °F

$WBGT\ Index = 0.7 (76\ ^\circ F) + 0.2 (118\ ^\circ F) + 0.1 (90)\ ^\circ F = 53.2 + 23.6 + 9.0 = 85.8\ ^\circ F$

(c) Determine heat category using figure 3-2. Example: WBGT Index at 85.8 °F is Heat Category 3.

c. The following is a list of WBGT equipment and national stock numbers:

- (1) WBGT, without tripod, 6665-00-159-2218.
- (2) WBGT, with tripod, 6665-01-381-3023.
- (3) WBGT black globe thermometer, replacement part, 6685-01-110-4429.
- (4) WBGT wet bulb thermometer, replacement part, 6685-01-110-4430.
- (5) WBGT dry bulb thermometer, replacement part, 6685-01-110-6563.
- (6) Hand-held automated heat stress monitor, 2H-6685-01-055-5298, developed by the U.S. Navy.
- (7) Wet bulb-globe temperature wick, replacement part, 5180-0001.
- (8) Water reservoir, 6013-0145.
- (9) Black globe analog, round piece that fits over black thermometer, 6013-0142.

d. Commercial automated WBGT heat stress monitors can be obtained from—

- (1) Environmental Heat Stress Monitor, Southwest Research Institute, 6220 Culebra Road, San Antonio, TX 78228, <http://www.swri.edu/>
- (2) AFC International Inc., P.O. Box 894, DeMotte, IN 46310, <http://www.afcintl.com/>
- (3) Vista Environmental, 4 Quality Street,
- (4) Kyoto Electronics Manufacturing Co., LTD, 8 – 3 Niban-cho Chiyoda-ku, Tokyo 102-0084, Japan, <http://www.kagaku.com/kem/english.html#product>
- (5) ESI Environmental Sensors, Inc., 100-4243 Glanford Ave., Victoria, British Columbia, Canada V8Z 4B9, <http://www.esica.com/index.html>
- (6) INNOVA AirTech Instruments A/S, Energivej 30, 2750 Ballerup, Denmark, <http://www.innova.dk/>
- (7) CIH Equipment Co., Inc., 107-G Dunbar Avenue, Oldsmar, FL 34677, <http://www.cihequip.com/>
- (8) Sigma-Aldrich Corp., St. Louis, MO, <http://www.sigmaaldrich.com>

## Appendix C Commander's, Senior NCO's and Instructor's Guide to Risk Management of Heat Casualties

(The following pages are extracted from:

[http://usachppm.apgea.army.mil/doem/pgm34/HIPP/HeatRiskMan%20Guide%20APR03\\_4.pdf](http://usachppm.apgea.army.mil/doem/pgm34/HIPP/HeatRiskMan%20Guide%20APR03_4.pdf) )

# Commander's, Senior NCO's and Instructor's Guide to Risk Management of Heat Casualties

**Risk Management is the process of identifying and controlling hazards to protect the force.**

## Possible Outcomes of inadequate climatic heat management:

### Casualty

Heat Cramps  
Heat Exhaustion  
Heat Stroke  
Water Intoxication (Over Hydration)

### Risk Severity

Marginal  
Critical  
Critical-Catastrophic  
Critical-Catastrophic

## The Five Steps of Risk Management are:

# 1

## Identify Hazards

- H**igh heat category, especially on several sequential days  
(Measure WBGT when ambient temperature is over 75° F)
- E**xertional level of training, especially on several sequential days
- A**cclimatization (and other individual risk factors – see table below)
- T**ime (length of heat exposure and recovery time)

### Individual Risks for Heat Casualties (The more factors, the higher the risk)

- **Not acclimatized** to heat (need 10-14 days to get trainees adequately acclimated) (Pay close attention to personnel from cooler climates and regions with lower humidity.)
- Exposure to cumulative days (2-3 days) of any of the following
  - Increased heat exposure
  - Increased exertional levels.
  - Lack of quality sleep
- Poor fitness (Unable to run 2 miles in < 16 minutes)
- Overweight
- Minor illness (cold symptoms, sore throat, low grade fever, nausea, vomiting)
- Taking medications (either prescribed or over the counter)/ supplements/ dietary aids Ex: Allergy or cold remedies. Ephedra supplement
- Use of Alcohol in the last 24 hours
- Prior history of heat illness (any heat stroke, or >2 episodes of heat exhaustion)
- Skin disorders such as heat rash and sun burn which prevent effective sweating
- Age > 40 years



## 2 Assess Hazards

- When ambient temperature is over 75° F, constantly assess the **heat category** using Wet Bulb Globe Temperature (WBGT)
- Know your Soldiers! Identify early who will be at increased risk based on **individual risk factors**.
- Check **hydration status** at the end of each training day. Give extra fluid at night and in the morning if hydration is inadequate.
  - Review Riley (water) card or Ogden cords
  - Ask about urine color. Urine is clear if well hydrated, dark orange if poorly hydrated.
- Daily **assess the overall risk** for developing a heat casualty (may use a risk matrix).

The following matrix has been used successfully by Commanders.

### Example of a Heat Injury Risk Management Matrix

Scores assigned to different conditions based on risk for developing a heat injury.  
This scoring system: 0= Low risk; 1=Medium risk, 2=High risk; 3=Extreme risk

RISK FACTORS	Level of Risk (For each Factor Circle the Appropriate Condition)			
	0	1	2	3
Risk Management Worksheet	All control measures implemented			Not all control measures implemented
Heat (WBGT at site)	None (Less than Category 1)	Category 1	Category 2 and 3	Category 4 and 5
Number. Sequential Days Heat Cat 5	0	1	2-3	≥4
Heat Injuries in the unit in last 2 Days	None	Heat Cramps	Heat Exhaustion	Heat Stroke*
Work in Past Two Days (see below)	Easy	Easy	Moderate	Hard
Projected Work for the Present Day	Easy	Easy	Moderate	Hard
Heat Acclimatization Days	>13	7-13	3-6	<3
Leader/Cadre Presence	Full time	Substantial	Minimal	None
Length of Duty Time of Cadre < 1 Month	18 Months	7-18 Months		1-6 Month
Communication System	Radio and Phone	Phone Only	Radio Only	None
Rest in Previous 24 hours	>7 Hours	5-7 Hours	2-4 Hours	<2 hours

Cumulative score: 25-33 = extreme risk, 16-24 = high risk, 7-15 = medium risk, 0-6 = low risk.

*\*If Heat Stroke has occurred in unit in past 2 days, risk level= extreme risk*

Easy Work	Moderate Work	Hard Work
<ul style="list-style-type: none"> <li>• Weapon maintenance</li> <li>• Walking hard surface at 2.5 mph, &lt; 30lb load</li> <li>• Marksmanship training</li> <li>• Drill and ceremony</li> </ul>	<ul style="list-style-type: none"> <li>• Walking loose sand at 2.5 mph, no load</li> <li>• Walking hard surface at 3.5 mph, &lt; 40lb load</li> <li>• Calisthenics</li> <li>• Patrolling</li> <li>• Individual movement techniques, i.e. low crawl, high crawl</li> </ul>	<ul style="list-style-type: none"> <li>• Walking hard surface at 3.5 mph &gt; 40lb load</li> <li>• Walking loose sand at 2.5 mph with load</li> <li>• Field assaults</li> </ul>

# 3 Develop Controls

## Education

- Establish SOPs. Ensure all personnel are trained and follow SOPs for Heat Casualty Prevention.
- Ensure all bulletin boards have Heat Casualty Prevention posters and all leaders have Heat Casualty Prevention aids.

## Planning

- Adjust the training schedule to minimize consecutive days of heavy physical training, especially if other heat stressors exist (e.g. heat exposure and lack of quality sleep)
- Plan communications, medical and evacuation support.
- Plan and provide adequate hydration for *all* personnel (including Cadre and Drill Instructors).
- When planning training events, keep in mind:
  - **Time of day the training is conducted** – morning is cooler
  - **Location of training**
    - Sun vs. shade. Rest in shade.
    - Open vs. protection from wind - wind has cooling effect
    - Open up the formation to decrease heat strain.

### 3. Clothing

- Loose, lightweight preferable to heavy, restrictive (i.e., body armor) when feasible

### 4. Where in training cycle

- Most Heat Casualties occur in the 2<sup>nd</sup> or 3<sup>rd</sup> week of Recruit training.
- Acclimatization can take 7-14 days, depending on the physical condition of the trainee.
- After moderate to hard work in heat category  $\geq 3$ ; take cold, nude showers at the end of the day.

## Identification

- Identify previous heat exhaustion or heat stroke Soldiers and mark visibly on uniform (tape or cord).
- Identify Soldiers who have recently arrived from both cooler and less humid environments.
- Identify overweight Soldiers and Soldiers who are unfit.
- Identify Soldiers on medications and mark visibly on uniform (tape or cord).
- Seriously consider taking out of training Soldiers who have had alcohol within the last 24h. Seriously consider having ill Soldiers seen on sick call.
- Note and document heat category hourly. Position WBGT at site of training.

## Develop a Hydration Monitoring System

- Examples of monitoring methods:
  - **Riley (water) card.** On the card, Battle buddy is to write the amount of water the Soldier has drunk.
  - **Ogden Cord** is 550 cord, parachute cord or shoestring that is tied to a uniform buttonhole or ear protection case. Soldiers tie a knot in the cord each time they finish a canteen (1 quart) of water.

## 3

**Develop Controls (continued)****Know Standardized Guidelines for Warm Weather Training****Fluid Replacement and Work/Rest Guide***Acclimatized (after approx two weeks training) Wearing BDU, Hot Weather*

Heat Category	WBGT Index, (F°)	Easy Work		Moderate Work		Hard Work	
		Work/Rest	Water Intake (Qt/h)	Work/Rest	Water Intake (Qt/h)	Work/Rest	Water Intake (Qt/h)
1	78-81.9	NL	½	NL	¾	40/20 min	¾
2 (Green)	82-84.9	NL	½	50/10 min	¾	30/30 min	1
3 (Yellow)	85-87.9	NL	¾	40/20 min	¾	30/30 min	1
4 (Red)	88-89.9	NL	¾	30/30 min	¾	20/40 min	1
5 (Black)	> 90	50/10 min	1	20/40 min	1	10/50 min	1

- The work-rest times and fluid replacement volumes will sustain performance and hydration for at least 4 h of work in the specified heat category. Fluid needs can vary based on individual differences ( $\pm \frac{1}{4}$  qt/h) and exposure to full sun or full shade ( $\pm \frac{1}{4}$  qt/h).
- NL= no limit to work time per hour.
- Rest means minimal physical activity (sitting or standing), accomplished in shade if possible.
- CAUTION:** Hourly fluid intake should not exceed 1½ quarts.
- Daily fluid intake **should not exceed 12 quarts.**
- If wearing body armor add 5°F to WBGT in humid climates
- If wearing NBC clothing (mission-oriented protective posture (MOPP 4)), add 10°F to WBGT index for easy work, and 20°F to WBGT index for moderate and hard work.

**Easy Work** = Walking hard surface 2.5 mph <30# load, Weapon maintenance, Marksmanship training  
**Moderate Work** = Patrolling, Walking sand 2.5 mph no load, Calisthenics  
**Hard Work** = Walking sand 2.5 mph w/load, Field assaults

**Continuous Work Duration and Fluid Replacement Guide***Acclimatized (after approx two weeks training) Wearing BDU, Hot Weather*

**It is assumed the trainees performing these continuous effort tasks have not yet had heat stress or dehydration prior to this activity and will have several hours of rest afterwards.**

Heat Category	WBGT Index, (F°)	Easy Work		Moderate Work		Hard Work	
		Work (min)	Water Intake (Qt/h)	Work (min)	Water Intake (Qt/h)	Work (min)	Water Intake (Qt/h)
1	78-81.9	NL	½	NL	¾	70	1
2 (Green)	82-84.9	NL	½	150	1	65	1 ¼
3 (Yellow)	85-87.9	NL	¾	100	1	55	1 ¼
4 (Red)	88-89.9	NL	¾	80	1 ¼	50	1 ¼
5 (Black)	> 90	180	1	70	1 ½	45	1 ½

- NL can sustain work for at least 4 hours in the specified heat category.
- Fluid needs can vary based on individual differences ( $\pm \frac{1}{4}$  qt/hr) and exposure to full sun or full shade ( $\pm \frac{1}{4}$  qt/hr).

# 4

## Implement Controls

### Decision to accept risk is made at the appropriate level – normally by Battalion Commander

- Made in accordance with appropriate MACOM regulation

### Identified controls are in place

- Update WBGT hourly when ambient temperature is  $\geq 75^{\circ}\text{F}$ .
- Adhere to work/rest cycle in high heat categories. Rest in shade.
- For tasks requiring continuous effort, adhere to guideline and allow extended rest afterwards.
- Training event incorporates good prior planning.

### Monitor and enforce hydration standard

- Encourage frequent drinking, but not to exceed 1 ½ quarts per hour or 12 quarts per day. Make water more palatable, if possible, by cooling.
- Do not allow Soldiers or trainees to empty canteens to lighten load (consider imposing a penalty in timed events).
- Ensure Soldiers are well hydrated before training. Ask about urine; urine is clear if well hydrated.
- Check Riley (water) card or Ogden Cord frequently.

### Monitor and enforce eating meals

- Ensure all meals are eaten during the meal break
- Ensure adequate time to eat and drink meals
- Table salt may be added to food when the heat category is high. Salt tablets are *not* recommended

### Execute random checks

- Spot checks by Cadre, Senior NCO's, and Drill Instructors
- Enforce battle buddy checks – need to be aware of each other's eating, drinking and frequency of urination
- Plan placement of leaders to observe and react to heat injuries in dispersed training

### Follow clothing recommendations

- Heat category 1-2: no restrictions
- Heat category 3: Unblouse trouser legs, unbuckle web belt
- Heat category 4-5:
  - Direct Soldiers to remove Individual Body Armor as often as necessary to prevent overheating
  - Unblouse trouser legs, unbuckle web belt
  - Remove t-shirt from under ACU/BDU top or remove ACU/BDU top down to T-shirt (depends whether biting insects are present)
  - Remove helmets unless there are specific safety reasons to keep them on (e.g.: range).
- MOPP 4: Add **10°F** to WBGT index for easy work, and **20°F** to WBGT index for moderate to hard work.

# 5 Supervise & Evaluate

- Enforce SOPs-Battalion and Company Commanders are personally responsible for enforcement
- Delegate authority to ensure control measures have been implemented
- Monitor adequacy/progress of implementation of control measures
- Conduct spot checks of cadre. Do cadre have current WBGT? Are cadre implementing work/rest/drink cycles? Make on-the-spot corrections. Lead by example.
- Conduct spot checks of recruits. Ask recruits questions while observing their mental status and physical capabilities. Look out for common signs and symptoms which can rapidly progress to serious signs and symptoms. Ask recruits when did they last urinate and was their urine clear?
- If 1-2 recruits become heat casualties, immediately evaluate each Soldier for early signs and symptoms of becoming an impending heat casualty.
- When controls fail, heat injuries occur. The ability to recognize heat injury is paramount. Take immediate action if any heat injuries are observed or suspected. Stop-rest-cool then evaluate in accordance with warning signs and symptoms. **If in doubt, evacuate.**

## Warning Signs and Symptoms of Heat Casualty and Water Intoxication

Indications of possible Heat Casualty	
<p><b>More Common Signs / Symptoms</b></p> <ul style="list-style-type: none"> <li>• Dizziness</li> <li>• Headache</li> <li>• Nausea</li> <li>• Unsteady walk</li> <li>• Weakness or fatigue</li> <li>• Muscle cramps</li> </ul>	<p><b>Immediate Actions</b></p> <ul style="list-style-type: none"> <li>• Remove from training</li> <li>• Allow casualty to rest in shade</li> <li>• Loosen clothing</li> <li>• Take sips of water</li> <li>• While doing the above, call for a Medic to evaluate the Soldier (Medic will monitor temperature and check for mental confusion)</li> </ul> <p><b>If no medic is available call 911</b></p>
<p><b>Serious Signs / Symptoms</b></p> <ul style="list-style-type: none"> <li>• Hot body</li> <li>• Confusion, agitation (Mental Status Assessment)</li> <li>• Vomiting</li> <li>• Involuntary bowel movement</li> <li>• Convulsions</li> <li>• Weak or rapid pulse</li> <li>• Unresponsiveness, coma</li> </ul>	<p><b>Immediately call 911 and:</b></p> <ul style="list-style-type: none"> <li>• Lay person down in shade with feet elevated</li> <li>• Undress as much as possible</li> <li>• Aggressively apply ice packs or ice sheets</li> <li>• If no ice sheets, pour cold water over casualty and fan. Continue cooling while in transit</li> <li>• If conscious, give <u>sips</u> of water while awaiting ambulance</li> <li>• Monitor airway and breathing until ambulance or Medevac arrive</li> </ul>

## 5

**Supervise & Evaluate** contin-**Indications of possible Water Intoxication  
(Over Hydration)****Signs and  
Symptoms**

Confusion  
Weakness  
Vomiting

**What to do:****Ask these questions to the Soldier or battle buddy:**

- Has Soldier been eating? Check rucksack for # of MRE's left.
- Has Soldier been drinking a lot? (Suspect water intoxication if Soldier has been drinking constantly).
- How often has Soldier urinated? (frequent urination seen with water intoxication; infrequent urination with heat illness)

If Soldier has been eating, drinking and urinating a lot, yet has these symptoms, **immediately call 911 for emergency transport**

**Mental Status Assessment**

An important sign that the Soldier is in a **serious life-threatening** condition is the presence of mental confusion (with or without increased temperature). Anyone can do a mental status assessment asking some

**Call for 911 if any of the following exist:**

**What is your name?**

(Does not know their name.)

**What month is it? What year is it?**

(Does not know the month or year.)

**Where are we/you?**

(Is not aware of location or surroundings.)

**What were you doing before you became ill?**

(Does not know the events that led to the pre-

See <http://chppm-www.apgea.army.mil/heat> for electronic versions of this document and other heat injury prevention resources



## Hot Weather Casualties and Injuries Chart

- Train commanders and soldiers on heat injury prevention and heat risk assessment
- Remember the acronym **H-E-A-T** when training in hot weather  
(**H**: heat category; **E**: exertion level; **A**: acclimatization; **T**: time of heat exposure and recovery time)
- Follow recommended fluid replacement guidelines and ensure nutritional requirements are met

Hot Weather Injuries and Casualties			
Cause	Symptoms	First-Aid	Prevention
<b>Sunburn</b>			
<ul style="list-style-type: none"> <li>• Exposure of skin to direct sun</li> <li>• Can occur on overcast days</li> </ul>	<ul style="list-style-type: none"> <li>• Red, hot skin</li> <li>• May blister</li> <li>• Moderate to severe pain</li> <li>• Can result in fever</li> </ul>	<ul style="list-style-type: none"> <li>• Move to shade; loosen clothing if necessary</li> <li>• Apply cold compress or immerse in cool water</li> <li>• Apply moisturizing lotion to affected areas</li> <li>• Hydrate with fluids</li> <li>• Do not break blisters</li> </ul>	<ul style="list-style-type: none"> <li>• Adequate sun protection</li> <li>• Use sunscreen liberally and apply often, especially when sweating excessively</li> <li>• Select SPF 15 or higher</li> <li>• Proper wear of clothing, cap</li> </ul>
<b>Heat Rash (Prickly Heat)</b>			
<ul style="list-style-type: none"> <li>• Restrictive clothing</li> <li>• Excessive sweating</li> <li>• Inadequate hygiene</li> <li>• Causes heat intolerance if 20% of skin affected</li> </ul>	<ul style="list-style-type: none"> <li>• Red, itchy skin</li> <li>• Bumpy skin due to blocked pores</li> <li>• Moderate to severe itching</li> </ul>	<ul style="list-style-type: none"> <li>• Apply cold compress or immerse in cool water</li> <li>• Keep area affected dry</li> <li>• Control itching and infection with prescribed medications</li> </ul>	<ul style="list-style-type: none"> <li>• Proper wear of clothing</li> <li>• Shower (nude) after excessive sweating</li> </ul>
<b>Heat Cramps</b>			
<ul style="list-style-type: none"> <li>• Excessive loss of salt from body due to excessive sweating</li> <li>• Not acclimatized to hot weather</li> </ul>	<ul style="list-style-type: none"> <li>• Painful skeletal muscle cramps or spasms</li> <li>• Mostly affects legs and arms</li> </ul>	<ul style="list-style-type: none"> <li>• Replace salts</li> <li>• Sit quietly in the shade or cool area</li> <li>• Massage affected muscle</li> <li>• Drink oral rehydration package or sports drink</li> <li>• Drink 0.05 to 0.1% salt solution (add ¼ of MRE salt packet to 1 quart canteen)</li> <li>• Get medical evaluation if cramps persist</li> </ul>	<ul style="list-style-type: none"> <li>• Eat all meals to replace salt</li> <li>• Consume salt-supplemented beverages if adequate meals have not been consumed prior to prolonged periods of heavy sweating</li> <li>• Ensure adequate heat acclimatization</li> </ul>
<b>Heat Exhaustion</b>			
<ul style="list-style-type: none"> <li>• Body fatigue and strain on heart due to overwhelming heat stress</li> <li>• Dehydration (see below)</li> <li>• Inadequate acclimatization</li> <li>• Inadequate physical fitness for the work task</li> <li>• Most common exertional heat illness</li> </ul>	<ul style="list-style-type: none"> <li>• Dizziness</li> <li>• Fatigue</li> <li>• Weakness</li> <li>• Headache, nausea</li> <li>• Unsteady walk</li> <li>• Rapid pulse</li> <li>• Shortness of breath</li> </ul>	<ul style="list-style-type: none"> <li>• Initiate active cooling by best means available.</li> <li>• Move to shade and loosen clothing</li> <li>• Lay flat and elevate feet</li> <li>• If available, wrap Soldier in ice sheets and trade out as they warm. If no ice sheets, spray/pour water on soldier and fan for cooling</li> <li>• Monitor with the same (one) instructor or supervisor</li> <li>• Assess soldier's mental status every few minutes</li> <li>• Have soldier slowly drink one full canteen (quart) of cool water every 30 minutes with a maximum of 2 canteens</li> <li>• If not improved in 30 minute, evacuate for further medical care</li> <li>• NOTE: Those who recover within 30 minutes should return to light indoor duty on a profile for the remainder of the day</li> </ul>	<ul style="list-style-type: none"> <li>• Allow for acclimatization</li> <li>• Monitor WBGT</li> <li>• Keep soldiers in shade whenever possible</li> <li>• Follow water replacement guides</li> <li>• Observe work-rest cycles</li> <li>• Identify high risk individuals</li> <li>• Maintain buddy system</li> <li>• Eat all meals in garrison and field</li> <li>• Do not take dietary supplements</li> <li>• Modify uniform accordingly</li> <li>• Teach early recognition of symptoms</li> <li>• Recognize cumulative effect of sequential hot days</li> <li>• Reevaluate training mission if several mild heat injuries occur</li> </ul>
<b>Heat Stroke</b>			
<ul style="list-style-type: none"> <li>• Prolonged exposure to high temperatures</li> <li>• Cumulative heat stress due to repetitive activity in hot environment</li> <li>• Failure of body's cooling mechanisms</li> <li>• Prolonged and overwhelming heat stress</li> <li>• Predisposing factors such as sickness, poor health or certain medications</li> </ul>	<ul style="list-style-type: none"> <li>• Any of above symptoms, but more severe</li> <li>• Nausea, vomiting</li> <li>• Altered mental status with agitation, confusion, delirium, disorientation</li> <li>• Elevated temperature, usually above 104° F</li> <li>• Can progress to loss of consciousness, coma, and seizures</li> </ul>	<ul style="list-style-type: none"> <li>• This is a <b>medical emergency</b> and can lead to death! <b>CALL 911 to evacuate</b> Soldier to a medical facility immediately!</li> <li>• <b>Begin cooling aggressively.</b> Body temperature that does not go below 100° F with active cooling or ANY mental status changes calls for immediate evacuation.</li> <li>• Initiate measures for heat exhaustion</li> <li>• Apply ice packs or iced sheets</li> <li>• Assess Soldier's mental status every few minutes</li> <li>• If conscious, give sips of cool water while waiting for evacuation or ambulance</li> <li>• Do not give water to unconscious Soldier</li> <li>• Monitor airway and breathing</li> <li>• If available, start intravenous (IV) fluids but limit to 1000 ml (1 liter) normal saline</li> <li>• Continue cooling process during transport</li> </ul>	<ul style="list-style-type: none"> <li>• Follow measures for heat exhaustion</li> <li>• Plan medical support for heat intensive operations</li> <li>• Ensure appropriate Evacuation capabilities available</li> <li>• Ensure preventive measures are in place</li> </ul>
<b>Additional Medical Considerations in the Hot Weather Environment:</b>			
<b>Dehydration</b>			
<ul style="list-style-type: none"> <li>• Depletion of body fluids and possibly salt</li> </ul>	<ul style="list-style-type: none"> <li>• Dizziness</li> <li>• Weakness and fatigue</li> <li>• Rapid pulse</li> </ul>	<ul style="list-style-type: none"> <li>• Replace lost water and salt</li> <li>• Water should be sipped, not gulped</li> <li>• Evacuate for medical treatment</li> </ul>	<ul style="list-style-type: none"> <li>• Drink 3-6 quarts of fluid per day</li> <li>• Follow fluid replacement guidelines</li> <li>• Consume full meals and drink at mealtime</li> <li>• Do not take dietary supplements</li> </ul>
<b>Over Hydration (Hyponatremia)</b>			
<ul style="list-style-type: none"> <li>• Over hydration or water intoxication</li> <li>• Decreased meals or dieting</li> <li>• Loss of body salt</li> <li>• Misdiagnosis and treatment for dehydration</li> </ul>	<ul style="list-style-type: none"> <li>• Confusion</li> <li>• Weakness</li> <li>• Nausea, vomiting</li> </ul>	<ul style="list-style-type: none"> <li>• Call 911 for immediate evacuation</li> </ul>	<ul style="list-style-type: none"> <li>• Follow fluid replacement guidelines</li> <li>• Replace lost salt by consuming meals and sports drinks, as directed.</li> <li>• Provide snacks or carbohydrate electrolyte beverage during long training events</li> <li>• Do not take dietary supplements</li> </ul>

# Appendix D

## Temperature/Humidity to Heat Category Conversion

This chart (table D-1, below) is not a substitute for a WBGT reading when implementing heat injury prevention measures, but may be used when no other method to determine the WBGT and corresponding heat category is available.

**Table D-1**  
**Temperature/Humidity to Heat Category Conversion Chart**

		Relative Humidity															
		25	30	35	40	45	50	55	60	65	70	75	85	90	95	100	
	98	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	97	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	96	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
T	95	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	94	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
E	93	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	92	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
M	91	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
	90	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
P	89	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5	
	88	3	4	4	5	5	5	5	5	5	5	5	5	5	5	5	
E	87	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	
	86	2	3	3	4	4	4	5	5	5	5	5	5	5	5	5	
R	85	2	2	3	3	3	4	4	5	5	5	5	5	5	5	5	
	84	2	2	2	3	3	3	3	4	4	5	5	5	5	5	5	
A	83	1	1	2	2	2	3	3	3	4	4	5	5	5	5	5	
	82	1	1	2	2	2	2	2	3	3	4	4	5	5	5	5	
T	81	1	1	1	1	1	2	2	2	3	3	4	4	5	5	5	
	80	0	1	1	1	1	1	1	2	2	3	3	4	4	4	5	
U	79	0	0	1	1	1	1	1	1	2	2	2	3	3	3	4	
	78	0	0	0	0	1	1	1	1	1	2	2	2	3	3	3	
R	77	0	0	0	0	0	1	1	1	1	1	1	2	2	2	3	
	76	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2	
E	75	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	
	74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

## Glossary

AOD .....	Administrative Officer of the Day
APFT .....	Army Physical Fitness Test
ASOS .....	Air Support Operations Squadron
HEAT .....	Heat category, Exertion level, Acclimatization, Time of heat exposure and recovery time
IET .....	Initial-entry Training
MACH .....	Martin Army Community Hospital
MOPP .....	Mission Oriented Protective Posture
PTU .....	Physical Training Uniform
SDNCO .....	Staff Duty Non-Commissioned Officer
SDO .....	Staff Duty Officer
USAIC .....	United States Army Infantry Center
USAMEDDAC .....	United States Army Medical Activity
WBGT .....	Wet Bulb Globe Temperature

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